

CLAIMS

1. An optical multiplexer/demultiplexer, including:

5 - an integrated optics substrate defining a main propagation path for optical radiation, said main propagation path having an aggregate port for transmitting an aggregate optical radiation including a plurality of wavelengths,

10 - a plurality of selective optical couplers distributed along said main propagation path, each said selective optical coupler being arranged for adding to and removing from said aggregate optical radiation a respective tributary optical radiation centered around a respective tributary wavelength, and

15 - a plurality of tributary propagation paths for optical radiation provided in said integrated optics substrate, each of said tributary paths extending between a respective one of said selective optical couplers and a respective tributary port for  
20 transmitting said tributary optical radiation centered around said respective tributary wavelength.

2. The multiplexer/demultiplexer of claim 1, wherein said main propagation path extends in a zig-zag pattern including at least one cusp, at least one  
25 reflecting element being arranged at said at least one cusp to produce propagation of optical radiation along said zig-zag propagation pattern.

3. The multiplexer/demultiplexer of claim 2, wherein said at least one reflecting element includes a  
30 reflecting metallization associated with said integrated optics substrate.

4. The multiplexer/demultiplexer of claim 2, wherein said at least one reflecting element has associated therewith a respective optical coupler.

5. The multiplexer/demultiplexer of claim 4, wherein said respective optical coupler is arranged to obtain 50% optical energy coupling.

6. The multiplexer/demultiplexer of claim 4,  
5 wherein said reflecting element includes a reflective surface at the end surface of the respective optical coupler.

7. The multiplexer/demultiplexer of claim 2,  
10 wherein said main propagation path in said integrated optics substrate includes at least two cusps with at least two respective reflecting elements located at the said two cusps; at least one of said selective optical couplers being arranged between said at least two respective reflecting elements.

15 8. The multiplexer/demultiplexer of claim 2, wherein said integrated optics substrate is in the form of a strip having opposed side surfaces and wherein at least two reflecting elements are arranged at said opposed surfaces of said integrated optics substrate.

20 9. The multiplexer/demultiplexer of claim 1, wherein said integrated optics substrate is in the form of rectangular chip.

10. The multiplexer/demultiplexer of claim 1,  
25 wherein said integrated optics substrate is of a material selected out of the group consisting of silica on silicon and silica.

11. The multiplexer/demultiplexer of claim 1,  
30 wherein said selective optical couplers are arranged to obtain 100% energy transfer of optical radiation propagating along said main propagation path.

12. The multiplexer/demultiplexer of claim 1,  
wherein said selective optical couplers have associated therewith respective optical filters each arranged to filter out of said optical radiation propagating along  
35 said main propagation path a respective optical

radiation centered around a respective filter wavelength .

13. The multiplexer/demultiplexer of claim 12, wherein said filters are in the form of Bragg gratings each reflecting radiation at a respective filter wavelength.

14. The multiplexer/demultiplexer of claim 13, wherein said Bragg gratings have a reflectivity of at least 35 dB.

15. The multiplexer/demultiplexer of claim 13, wherein said Bragg gratings are photoinduced in said integrated optics substrate.

16. An optical multiplexer/demultiplexer, including:

- an integrated optics substrate including optical waveguides defining a main propagation path for optical radiation, said main propagation path having an aggregate port for transmitting an aggregate optical radiation including a plurality of wavelengths,

- a plurality of selective optical couplers, said optical couplers being formed by said optical waveguides and distributed along said main propagation path, each said selective optical coupler being arranged for adding to and removing from said aggregate optical radiation a respective tributary optical radiation centered around a respective tributary wavelength, and

- a plurality of tributary propagation paths for optical radiation provided in said integrated optics substrate, each of said tributary paths extending between a respective one of said selective optical couplers and a respective tributary port for transmitting said tributary optical radiation centered around said respective tributary wavelength.

17. An optical multiplexer/demultiplexer, including:

- an integrated optics substrate defining a main propagation path for optical radiation, said main propagation path having an aggregate port for transmitting an aggregate optical radiation including a plurality of wavelengths,

- a plurality of selective optical couplers distributed along said main propagation path, each said selective optical coupler being arranged for adding to and removing from said aggregate optical radiation a respective tributary optical radiation centered around a respective tributary wavelength, and

- a plurality of tributary propagation paths for optical radiation provided in said integrated optics substrate, each of said tributary paths extending between a respective one of said selective optical couplers and a respective tributary port for transmitting said tributary optical radiation centered around said respective tributary wavelength,

wherein said main propagation path extends in a zig-zag pattern including at least one cusp, at least one reflecting element being arranged at said at least one cusp to produce propagation of optical radiation along said zig-zag propagation pattern, said at least one reflecting element including a reflecting metallization associated with said integrated optics substrate.

18. The optical multiplexer/demultiplexer of claim 17, wherein said integrated optics substrate includes optical waveguides defining said main propagation path for optical radiation, and wherein said optical couplers are formed by said optical waveguides.

19. An optical multiplexer/demultiplexer, including:

- an integrated optics substrate defining a main propagation path for optical radiation, said main propagation path having an aggregate port for transmitting an aggregate optical radiation including a plurality of wavelengths,

- a plurality of selective optical couplers distributed along said main propagation path, each said selective optical coupler being arranged for adding to and removing from said aggregate optical radiation a respective tributary optical radiation centered around a respective tributary wavelength, and

- a plurality of tributary propagation paths for optical radiation provided in said integrated optics substrate, each of said tributary paths extending between a respective one of said selective optical couplers and a respective tributary port for transmitting said tributary optical radiation centered around said respective tributary wavelength,

wherein said main propagation path in said integrated optics substrate includes at least two cusps with at least two respective reflecting elements located at the said two cusps; at least one of said selective optical couplers being arranged between said at least two respective reflecting elements.

20. The optical multiplexer/demultiplexer of claim 19, wherein said integrated optics substrate includes optical waveguides defining said main propagation path for optical radiation, and wherein said optical couplers are formed by said optical waveguides.

21. An optical multiplexer/demultiplexer, including:

- an integrated optics substrate defining a main propagation path for optical radiation, said main propagation path having an aggregate port for

transmitting an aggregate optical radiation including a plurality of wavelengths,

5       - a plurality of selective optical couplers distributed along said main propagation path, each said selective optical coupler being arranged for adding to and removing from said aggregate optical radiation a respective tributary optical radiation centered around a respective tributary wavelength, and

10       - a plurality of tributary propagation paths for optical radiation provided in said integrated optics substrate, each of said tributary paths extending between a respective one of said selective optical couplers and a respective tributary port for transmitting said tributary optical radiation centered  
15       around said respective tributary wavelength,

20       wherein said selective optical couplers have associated therewith respective optical filters each arranged to filter out of said optical radiation propagating along said main propagation path a respective optical radiation centered around a respective filter wavelength, said filters being in the form of Bragg gratings each reflecting radiation at a respective filter wavelength.

25       22. The optical multiplexer/demultiplexer of claim 21, wherein said integrated optics substrate includes optical waveguides defining said main propagation path for optical radiation, and wherein said optical couplers are formed by said optical waveguides.